ATTACHMENT A

Remarks

By this Amendment, the rejected claims have been amended for better clarity, consistency of term use, and/or to correct minor informalities. In addition, claims 25-28, 37-38, 43-51 and 55 have been canceled; and new claims 56-62 have been added. It is submitted that the present application is in condition for allowance for the following reasons.

In the *Claims Rejection – 35 USC § 112* section, independent claims 5, 6, 7, 12, 17 (now dependent on claim 12), 18 (now dependent on claim 15), 39, 40 and 43 (now canceled) were rejected as being indefinite; and the claims dependent therefrom were likewise rejected. In particular, the examiner objected to the common recitations in these claims where it seemed contradictory conditions/results were recited. It will initially be appreciated that the minimum speed of rotation Nmin, the maximum speed of rotation Nmax, and the constant volume of air Vc delivered by the turbocharging unit are all design constants for a given engine and turbocharging unit as well known in the art. In addition, there is also a turbocharging adaptation speed Na which is less than Nmax and at which the volume of engine air Ve equals the constant volume of air Vc.

Thus, as now made clear in all of these claims, the present invention is concerned with the operation of the engine under three conditions related to the turbocharging adaptation speed Na, as related to the volume of the engine air Ve and the constant volume of air Vc. In particular, those three conditions are:

- at the turbocharging adaptation speed Na, Vc=Ve,

- below the turbocharging adaptation speed Na, Vc>Ve,
- above the turbocharging adaptation speed Na, Vc<Ve.

It will be appreciated that there is also claimed an exhaust outlet section Sd which is selected so that Vc<Ve at the maximum speed Nmax, which is consistent with the "above" condition as Nmax is an upper limit of the speed.

In view of the above explanation and the claim changes made, it is submitted that independent claims 5, 6, 7, 12, 39, and 40 are now all definite.

In the § 112 rejection, dependent claim 55 was also objected to. However, as noted above, claim 55 is now canceled so that this rejection is no longer relevant.

In the *Claim Rejections – 35 USC § 103* section, independent **claim 39** was rejected under 35 USC § 103 as being unpatentable over Kim in view of GIANOLIO and NELSON; and independent **claim 53** was rejected as being unpatentable over GIANOLIO and NELSON. It will be appreciated that the novel portions of both claims 39 and 53 are substantially similar and are alleged to be taught by GIANOLIO, so that it is submitted that these claims are both allowable over these combinations of references for the following reasons.

GIANOLIO describes, with reference to the figure 1, a valve 1 associated with a port 2 formed inside a cylinder head 3. The valve head 1 rests against an annular seat provided in the cylinder head 3 at the end of the pipe 2. If the valve 1 of GIANOLIO is lowered, an annular passage will be created between the valve seat and the valve 1; and the gases ejected from the pipe 2 will form a vertical conical-shaped jet, with a vertical linear momentum and with no horizontal linear momentum.

The invention as recited in claims 39 and 53 creates a jet of ejected gases with a horizontal linear momentum by feeding gas only on an angular sector of an intake pipe outlet of an engine. This invention is best explained with reference to the appended drawings, where drawing 1 and drawing 2 are based on the left side of figure 11 of the application. Drawings 1 and 2 illustrate the valve in a closed and an open position respectively.

With reference then to drawings 1 and 2, the invention as recited in claims 39 and 53 claims that the pipe is provided upstream the valve head (VH) with a nozzle (NZ) defined between an upper half cylinder (UC) and a lower half cylinder (LC). The bottom figure of drawing 1 and drawing 2 are cross- section views in a plane (P) substantially perpendicular to a plane (Q) passing through an axis of the seat and through an axis of the cylinder (see top figure of drawing 1). The conical seat (S) is the portion of the surface of the cylinder head (CH) against which the valve head (VH) rests in the closed position.

As recited, the upper half cylinder (UC) is resting on an upper edge (UE) of the conical seat (S) This means that the parallel generating lines of the upper half cylinder (UC) pass by the upper edge (UE). In addition, as recited, in the plane P of the bottom figure of drawing 1, the upper half cylinder is tangent to said conical seat (S) along a generating line (L) thereof. Consequently, in the plane P of the bottom figure of drawing 1, the generating line (L) of the upper cylinder (UC) is aligned with the line of intersection of the conical seat (S) with the plane P. In other planes, these lines are not aligned since the conical seat (S) is conical, whereas the upper half cylinder (UC) is cylindrical.

As also recited, the lower half cylinder (LC) covers the half (VH1) of the valve head (VH) opposite the generating line (L). Thus, the lower half cylinder (LC) is located below the upper half cylinder (UC) and above the half of the valve head (VH1) opposite the generating line (L).

Thus, the nozzle (NZ) defined between the upper half cylinder (UC) and the lower half cylinder (LC) is directed to project gases between the conical seat (S) and the half of the valve head (VH2) at the side of the generating line (L) upon opening of the valve, as illustrated by arrow F on the bottom figure of drawing 2. Consequently, as illustrated on drawing 2, upon opening of the valve, the gases are ejected into the cylinder substantially through an angular sector of the opening created between the conical seat and the valve head, and are thus tangentially oriented with respect to the cylinder. It is thus possible to create a swirl movement and a stratification of gases into the cylinder, as illustrated on the top figure of drawing 1.

This construction cannot be obtained by GIANOLIO, in which the pipe does not have any nozzle enabling it to eject the gases only on a portion of the opening between the opened valve head and the cylinders head, so as to create an oriented jet of gases. Therefore, the noted recitations of independent claims 39 and 53 are neither shown nor made obvious by GIANOLIO, or in the other cited references so that both claims 39 and 53 are allowable. Similarly, claim 41 dependent from claim 39 is likewise allowable for this same reason.

Also in the *Claim Rejections – 35 USC § 103* section, independent **claim 40** was rejected under 35 USC § 103 as being unpatentable over Kim in view of GIANOLIO and NELSON and HITOMI; and independent **claim 54** was rejected as being unpatentable

over GIANOLIO in view of NELSON and HITOMI. It will be appreciated that the novel portions of both claims 40 and 54 are substantially similar and are alleged to be taught by GIANOLIO and HITOMI, so that it is submitted that these claims are both allowable over these combinations of references for the following reasons.

The invention is described with reference to the appended drawings 3 and 4 reproducing the right side of figure 11 of the application, with the valve in closed and opened position respectively. Thus, according to the invention as recited in claims 40 or 54, the sealing surface (T) of the intake valve is extended toward a piston by a cylindrical part (CP). The sealing surface (T) of the valve is the surface of the valve to be in sealing contact with the valve seat (S) of the cylinder head (CH) in the closed position of the valve. In addition, the cylinder head (CH) is provided with a cylindrical recess (R) to receive the cylindrical part (CP) of the valve such that a flat lower face (LF) of the valve is in a plane of the cylinder head (CH) when the valve rests on the associated valve seat (S), a clearance between the recess (R) and the valve being minimal (see right side of bottom figure of drawing 3).

As a consequence of these features as illustrated on drawing 4, at least at the beginning of the opening of the valve, the cylindrical part (CP) of the valve is in sealing contact with the cylindrical recess (R). However, as further recited, the recess (R) does not go beyond the following boundaries, which can be seen on top figure of drawing 3:

(a) two cylindrical portions (H) co-axial with the cylinder and tangent externally to the cylindrical recess (R) of the valve, and

(b) a conical surface (CS) extending a half-seat (HS1) of the valve (VH) delimited by a plane (Q) passing through an axis thereof and an axis of the cylinder (Plane Q is illustrated on top figure of drawing 3).

As a consequence of these features, the cylindrical recess (R) extends only on an angular sector about the axis A of the valve, as can be seen on the top figure of drawing 3.

Thus, at least at the beginning of the opening of the valve, an opening is created between the valve head and the valve seat (S) only in the angular sector opposite the cylindrical recess (R), between the valve and the conical surface (CS), and the gases of the intake pipe are ejected into the cylinder substantially through said angular sector, in a thus oriented manner, as illustrated by arrow F on drawing 4.

As further recited, the recess (R) is oriented to create a tangential velocity, with respect to the cylinder. Consequently, the gas jet (F) as shown in drawing 4 is oriented in the direction of the opened angular sector and creates a swirl into the cylinder to stratify the gases into the cylinder.

This claimed construction cannot be obtained by GIANOLIO, in which the gases are ejected in all directions around the valve head, not in an oriented manner; and such is not taught by any of the other cited references. Therefore, the noted recitations of independent claims 40 and 54 are neither shown nor made obvious by GIANOLIO, or in the other cited references so that both claims 40 and 54 are allowable. Similarly, claim 42 dependent from claim 40 is likewise allowable for this same reason.

It will be noted that new independent claim 58 also and more particularly claims the same feature discussed above for claims 40 and 54. It is thus submitted that new independent claim 58 is likewise allowable for this same reason.

It will also be noted that a (same) limitation has been deleted from independent claims 40 and 54, which limitations are now recited in new dependent claims 56 and 57 respectively dependent from claims 40 and 54. It is submitted that these claims are likewise allowable at least for the same reasons as discussed above for claims 40 and 54 from which they respectively depend.

It will further be noted that a (same) limitation has been deleted from independent claims 39, 40, 53 and 54, which limitations are now recited in new dependent claims 59-62 respectively dependent from claims 39, 40, 53 and 54. It is submitted that these claims are likewise allowable at least for the same reasons as discussed above for claims 40 and 54 from which they respectively depend.

In the action, independent claims 43 and 55, together with claims 46 and 48 dependent from claim 43 were rejected as obvious over art. However, as noted above, these claims are now canceled.

For all of the foregoing reasons, it is submitted that the present application is in condition for allowance and such action is solicited.